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Research and Theory on Aggression and Violence<sup>1</sup>

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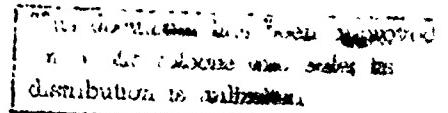


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## RESEARCH AND THEORY ON AGGRESSION AND VIOLENCE<sup>1</sup>

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It is a fact that violence of one sort or another has been a part of all man's history. Indeed, it appears that in some ways we have begun to adapt to this phenomenon. The numerous daily murders reported by our news media are regarded as "normal" activities of the nation. It is only when a president, a Nobel Prize winner, or some other highly visible person in our society is slain that we take serious notice. Even war appears to have become a part of life with which we have learned to live.

Many causative theories relating to the broad field of aggression have been reported in the literature. Some of these theories have been accepted when there has been no sound scientific evidence to substantiate them. Like the news, theories concerning the causes and control of aggression come and go while violence itself remains.

One might speculate that our lack of success in solving problems of aggression relates to the notion that a simple straightforward theory, based on casual observation of one segment of our society, can describe and provide answers to this complex phenomenon. Certainly, any medical advancements concerning the causes and control of disease were not made this way. Instead, important questions were brought into the laboratory where, under controlled conditions, a thorough analysis of the problem was made, until enough small pieces of information could be assembled into a working framework.

In view of this, it seemed unlikely that answers to the problem of aggression would be found by hit-and-miss observations of society. Instead, it appeared that a better solution was to study this phenomenon under

well-controlled laboratory conditions using animals as subjects. As knowledge about the animal subjects increased, more productive experimentation with humans might reasonably follow.

This approach is one which has been adopted by a number of behavioral scientists and one in which the authors too are presently engaged. Although the experimental analysis of aggression has been concerned mostly with investigating the behavior of lower organisms, some basic research with humans is presently being undertaken (Ulrich and Favell, in press). Furthermore, it is our contention that some of the results of the animal studies seem to have certain implications for human behavior. Prior to a discussion of these implications, however, a brief review of the basic research on aggression is in order.

#### RESEARCH

The investigation of aggression under controlled laboratory conditions presently being pursued at Western Michigan University resulted from the observation that two rats, painfully stimulated with electric shock, would assume an upright posture and fight (O'Kelly and Steckle, 1939; Ulrich and Azrin, 1962). Because this response appeared to be unlearned and occurred with a very short latency, it was referred to as reflexive. A number of studies were conducted to identify variables which related to this phenomenon.

First, various aspects of the electric shock which produced aggression were studied. Among these were shock intensity, duration of shock, shock frequency and length of the sessions (Ulrich and Azrin, 1962; Azrin, Ulrich, Hutchinson and Norman, 1964). Although other aversive stimuli, such as a tail pinch (Azrin, Hake and Hutchinson, 1965) or an air blast, were also found effective in producing aggression, electric shock was usually employed

as its parameters were more amenable to precise manipulation.

Following these studies concerning the properties of the aggression-producing stimuli, investigations were conducted which focused on the organism. These experiments yielded information concerning aggression as a function of maturity, social or isolated rearing and castration (Hutchinson, Ulrich and Azrin, 1965; Ulrich and Azrin, 1962). In additional studies, other aspects of the environment, such as floor space and the presence of inanimate objects, were investigated (Ulrich and Azrin, 1962; Azrin, Hutchinson and Sallery, 1964). This series of investigations led to the study of aggression in response to aversive stimuli in and between other species of animals. Hamsters, opposums, snakes, turtles, ferrets, pigeons and monkeys were included (Ulrich, 1967b; Ulrich, Wolff and Azrin, 1964) (also see review by Azrin in Psychology Today). The results of these studies further substantiated the earlier studies that painful electric shock produces aggression.

Since many of the behaviors of animals under these conditions seemed to suggest that a reflex might be involved, classical or Pavlovian conditioning of aggression was attempted. A tone, which initially produced no visible aggressive behavior in rats, was found to be capable of producing aggression (Vernon and Ulrich, 1966).

Up to this point, these studies employed humans to record the responses made by the various subjects. Although there was little difficulty in recording the "obvious fighting," problems arose in making discriminations about borderline responses. This problem of subjectively measuring aggression led to the development by Dr. Ronald Hutchinson of an automatic device for measuring and recording aggression in monkeys (Hutchinson, Azrin and Hake, 1966).

The apparatus consisted of a chair which comfortably restrained a monkey at his waist and kept him in an upright seated position. This position permitted him relatively free movement of the upper portion of his body. Mounted on the wall in front of him was a rubber hose which was sealed at one end with the other end connected to a pressure switch. Although pulling and bending the hose did not displace enough air to operate the pressure switch, biting did. Using this technique, the present authors, along with colleague Sylvia Dulaney, have found that hose biting produced by electric shock can be suppressed if the biting is followed immediately by a more intense shock (Ulrich and Symannek, 1969).

The fact that the same stimulus used to elicit aggression could also suppress it was interesting since it might have been the case that more aggression would have resulted. The crucial aspect, however, appeared to be the fact that the biting produced additional shock. It should be noted, however, that although hose biting ceased, aggressive responses toward other aspects of the monkey's environment appeared to increase when the punishment contingencies were employed.

Other studies have been conducted to determine the relationship between aggression, escape and avoidance (Ulrich and Craine, 1964; Ulrich Stachnik, Brierton and Mabry, 1965). In these studies, shock was delivered to paired rats who were given an opportunity to fight or escape the shock. Which response the rats made was found to be highly dependent upon the criterion for escape; the lower the escape criterion, the higher the probability escape would be the dominant behavior. On the other hand, if escape was difficult, the animals would fight (Ulrich, 1967b).

Let us now turn our attention to a discussion of learned aspects of aggression. The term "operant behavior" in general refers to those

behaviors which tend to operate or affect one's environment and are maintained or modified by their consequences (Skinner, 1938). The law of reinforcement refers to the fact that responses which are followed by something "favorable" tend to increase in frequency. For example, a hungry rat can be trained to press a lever to obtain food. In other words, we more often emit those behaviors for which we have been reinforced in the past.

A number of studies involving the operant strengthening of aggression provide us with information which shows that aggression can be taught. In one such study, a hungry rat was rewarded with water for attacking another rat (Ulrich, Johnston, Richardson and Wolff, 1963). Other studies revealed that stimulation in certain portions of a rat's brain could be used as reinforcement which, when made contingent upon aggression, could maintain attacks by rats upon rats, cats and monkeys (Stachnik, Ulrich and Mabry, 1966). In a similar study still in progress, human subjects repeatedly shock a small animal if they are rewarded with money for doing so.

Another important finding involving learned or operant aggression has to do with extinction-produced aggression. In an experiment where a hungry pigeon was pecking a disc to obtain food in the presence of a satiated pigeon, no movement toward the other pigeon occurred; the food deprived pigeon was occupied with procuring and consuming food. An extinction procedure was then employed in which pecking the disc was no longer effective in procuring food. The behavior of the food-deprived pigeon became aggressive and he viciously attacked the other bird (Azrin, 1967).

In summarizing the findings from the basic research laboratory, we know that a number of different aversive stimuli, generally referred to as painful, do produce aggression. This aggressive behavior appears to be

unlearned, although subsequent experience can alter the probability of its occurrence. Aggression can also be caused by its consequences. By reinforcing water-deprived organisms with water for aggressive behavior, we observe an increase in that class of behavior. For the most part, however, it is probably true that most aggression is a complex interaction between unlearned and learned forms of the aggressive behavior.

#### THEORY

Although at this time it is unlikely that society is ready or able to use the findings of the experimental laboratory toward solutions to the problems of human aggression, some similarities do seem apparent between the factors which produce aggression in controlled laboratory settings and some of the conditions which exist in our present culture and thus bear discussion. In this regard, let us turn to some recent events which involved aggression and violence and speculate as to some possible explanations.

On the fourth of April, 1968, an assassin's bullet brought down a man who, perhaps more than anyone else, represented a commitment to the nonviolent solution of America's racial dilemma. Since 1954 when he led the fight to end the practice of making Negroes go to the back of the bus, Martin Luther King had moved across the United States advancing and supporting efforts of nonviolent intervention. For these efforts, he was awarded the Nobel Peace Prize in 1964. In the face of both psychological and physical degradation, his crusade was never halted though his followers were hosed down, beset by police dogs, often beaten and occasionally killed.

During the same period, others were also active in seeking solutions to problems of unequal opportunities for minority citizens. In many instances, however, the suggestions of others were not limited to nonviolent

solutions. Indeed, as time went on, our country was more frequently being introduced to the spectacle of violence as a desperate solution to those problems which for so long had remained unattended and shunted by the power structure. In short, the nonviolent approach to which Dr. King dedicated his life was not accepted by all. Black America was learning that more rewarding results seemed to follow violence than were being won by peaceful approaches.

Many seemed to not understand why the black man was rioting. In spite of the supposed advanced intellect of our contemporary society and their supposed sophistication regarding the principles of behavior which govern the lives of mankind, most leaders remained blind to the facts which, time and again, have been made apparent to those whose job it is to modify the behavior of others. The principles of reinforcement, which we discussed earlier in relation to research on aggression, have long been understood as a powerful technique when applied correctly for controlling behavior. When it is deemed desirable for a response or class of responses to be increased in frequency, one watches for the occurrence of some bit of that behavior and then provides positive reinforcement following its emission. When human beings get things that they need and like as a function of their behavior, that behavior occurs more frequently and is maintained. When human beings get nothing that they need or like for a particular bit of behavior, that bit of behavior changes and other behaviors take its place. When responses occur and are given painful consequences, i.e. punishment, that behavior decreases in frequency and other kinds of behavior may take its place. On the basis of some of the aggression research, one might expect that the alternative behavior might be some type of aggressive counteraction.

Rewarding a child or an adult for a particular response will cause that response to occur more often. Punishing a child or an adult for a particular response will make that response occur less often. However, we should still consider the possibility that the aversive aspects of punishment may have the undesirable side effect of making the person receiving the aversive consequences somewhat aggressive. It is no surprise to the student of behavior when unrewarded actions disappear. Nor is it surprising when behavior tends to decrease as a function of its being punished. It is possible that the trends in the civil rights movement reflect these facts. The black American has not been rewarded in the same way as the white American. His efforts to receive equality through peaceful means have not paid off. America seemed to provide insufficient rewards for the nonviolent activities of Martin Luther King and even the few advances that did occur sometimes appeared to be grudgingly given.

On the other hand, America did begin to attend when the violent protests occurred. The cries from Watts received little attention until the Negro community there reacted in an extremely violent manner. Unfortunately, Watts was just one example of this practice. Time and again across this country the peaceful protest march, the voter registration drive, the peaceful open occupancy efforts, the peaceful negotiations, etc., did not produce rewarding consequences. Leaders were simply unwilling to meet peaceful requests with the rewards that would have made the peaceful efforts continue. Indeed, the peaceful efforts not only went unrewarded but were often brutally suppressed through the use of punishment. The threat of death hung equally over the Negro whether he was engaging in a peaceful, nonviolent demonstration or in a riot (National Advisory Commission on Civil Disorders, 1968).

In short, rioting frequently produced more rewarding results. After

the riot in Watts, the white community became concerned; Hollywood actors freely performed, dignitaries from around the country came to visit and to talk, and more money became available for needed programs.

Although it is difficult to analyze experimentally in humans, we know from laboratory experience that individual organisms will make difficult responses in order to remove or avoid aversive events. For humans it may be a rewarding experience to see something hated being destroyed. Seeing the cause of one's misery go up in smoke may be a rather rewarding experience. Perhaps the rewards of destroying institutions which for so many years represented only unhappy experiences added to the promotion of the already increasing frequency of violence.

The black man who did not get satisfactory results through peaceful techniques was finding that at least some benefits were coming as a function of violent action. Oddly enough, many leaders seemed surprised. The credibility of this surprise, although difficult to understand, does of course, like all behavior, have reasons. Civil rights has not usually been a very rational matter, and the principles of behavior, although understood in many other settings, seemed to be extremely elusive in this emotion-packed arena.

It would appear to be obvious that we can no longer ignore the facts of behavior. We must admit our mistakes in this area and begin to use the same behavioral practices to which we adhere in other settings to change the undesirable circumstances which appear to be causing and maintaining many of our cultural problems. When a child or an adult does something that we deem important, worthwhile or necessary, he receives our good will, our positive attention, and oftentimes, monetary reinforcement. This is done so that behavior will be maintained, and we do it openly as a part of our system of life. We typically attempt to see to it that the person who

does well receives his due reward. The person who does poorly or acts badly or unlawfully does not receive the same benefits and is indeed often punished. In the case of the black man's efforts toward achieving equality here in America, we have switched our contingencies by withholding rewards following nonviolent, lawful efforts at advancement and instead have appeared to reward violence. We cannot blame the black community for behaving in a violent way when we stand unwilling to reward alternative methods of advancement.

There is a young black leader in our community whom we have watched make numerous peaceful responses in relation to truly constructive progress. His gains from this tactic were minimal if not completely nonexistent. When he talked of violence, people began to listen. He was interviewed and received much attention in our newspapers, on our radios and on our television screens.

The community did not make active positive movements to promote the intense motivation of such young men to bring about desirable social change. He was not rewarded and the violence increased. It might be that our society can no longer act quickly enough to reach peaceful solutions. Soon after Martin Luther King was shot in Memphis, a white man in another city was dragged from his car and stabbed with no questions asked with respect to his beliefs or past behavior. He was white and he was stabbed apparently because of his color. We must understand that that stabbing was a predictable outcome of the conditions that our society has imposed upon his assailants. We must understand that the man who pulled the trigger and shot Martin Luther King is a product of the conditions imposed upon him by society. If we would have such behaviors cease, then we must modify the conditions which inevitably produce them.

How the culture can be modified is the question which has no one answer. We are, however, presently engaged in programs which speak to this issue and results are beginning to appear which indicate that a behavioral technology based upon the experimental and applied analysis of behavior, when used appropriately, can move our culture toward more promising goals (Ulrich, Kent and Favell, in press; Ulrich and Kent, in press; Ulrich and Stachnik, 1965; Ulrich, 1967b; Ulrich, Wolfe and Bluhm, 1968; Ulrich, 1968; Ulrich and Surratt, in press; Ulrich and Wolfe, in press; Ulrich, Stachnik and Mabry, 1966).

#### FOOTNOTES

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More detailed reports are contained in reviews in the following articles: Ulrich, R.E. Pain as a cause of aggression. American Zoologist, 1966, 6, 643-662; Ulrich, R.E. "Pain-aggression," in G.E. Kimble, Foundations of Conditioning and Learning. New York: Appleton-Century-Crofts, 1967; Ulrich, R.E., Hutchinson, R.R. and Azrin, N.H. Pain-elicited aggression. Psychological Record, 1965, 15, 111-126; Azrin, N.H. Pain and aggression. Psychology Today, May, 1967, 27-33.

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## REFERENCES

- Azrin, N.H. Pain and aggression. Psychology Today, May, 1967, 26-33.
- Azrin, N.H., Hake, D.F. and Hutchinson, R.R. Elicitation of aggression by a physical blow. Journal of the Experimental Analysis of Behavior, 1965, 8(1), 55-57.
- Azrin, N.H., Hutchinson, R.R. and Sallery, R.D. Pain-aggression toward inanimate objects. Journal of the Experimental Analysis of Behavior, 1964, 7(3), 223-227.
- Azrin, N.H., Ulrich, R.E., Hutchinson, R.R. and Norman, D.G. Effect of shock duration on shock-induced fighting. Journal of the Experimental Analysis of Behavior, 1964, 7(1), 9-11.
- Hutchinson, R.R., Azrin, N.H. and Hake, D.F. An automatic method for the study of aggression in squirrel monkeys. Journal of the Experimental Analysis of Behavior, 1966, 9(3), 233-237.
- Hutchinson, R.R., Ulrich, R.E. and Azrin, N.H. Effects of age and related factors on the pain-aggression reaction. Journal of Comparative and Physiological Psychology, 1965, 59(3), 365-369.
- National Advisory Commission on Civil Disorders, The U.S. Riot Commission Report, New York: Bantam Books, Inc., 1968.
- O'Kelly, L.E. and Steckle, L.C. A note on long-enduring emotional responses in the rat. Journal of Psychology, 1939, 8, 125-131.
- Skinner, B.F. The Behavior of Organisms. New York: Appleton-Century-Crofts, 1938.
- Stachnik, T.J., Ulrich, R.E. and Mabry, J.H. Reinforcement of intra- and inter-species aggression with intracranial stimulation. American Zoologist, 1966, 6, 663-668.
- Ulrich, R.E. Behavior control and public concern. Psychological Record, 1967, 17(2), 229-234.

- Ulrich, R.E. Behavior modification: theory, research and practice.  
Michigan Mental Health Research Bulletin, 1968, II(1), 5-13.
- Ulrich, R.E. The experimental analysis of aggression. Office of Naval Research, Technical Report, 1967a.
- Ulrich, R.E. Interaction between reflexive fighting and cooperative escape. Journal of the Experimental Analysis of Behavior, 1967b, 10(3), 311-317.
- Ulrich, R.E. and Azrin, N.H. Reflexive fighting in response to aversive stimulation. Journal of the Experimental Analysis of Behavior, 1962, 5(4), 511-520.
- Ulrich, R.E. and Craine, W.H. Behavior: persistence of shock-induced aggression. Science, 1964, 143(3609), 971-973.
- Ulrich, R.E. and Favell, J.E. "Human Aggression." In C. Neuringer and J. Michael, Behavior Modification in Clinical Psychology, New York: Appleton-Century-Crofts, in press.
- Ulrich, R.E., Johnston, M.M., Richardson, J. and Wolff, P.C. The operant conditioning of fighting behavior in rats. Psychological Record, 1953, 13(4), 465-470.
- Ulrich, R.E. and Kent, N.D. "Suggested Tactics for the Training of Psychologists." In R. Ulrich, T. Stachnik and J. Mabry, Control of Human Behavior, Volume II. Glenview, Illinois: Scott, Foresman and Co., in press.
- Ulrich, R.E., Kent, N.D. and Favell, J.E. "Behavior Control: Technology and Social Implications." In E. Mendelson, J. Swazey and S. Reiser, Biology, Medicine and Society, Harvard University Press, in press.
- Ulrich, R.E. and Stachnik, T.J. Educational implications of a science of human behavior. Psychology, 1965, 2(1), 5-7.

Ulrich, R.E., Stachnik, T.J., Brierton, G.R. and Mabry, J.H. Fighting and avoidance in response to aversive stimulation. Behaviour, 1965, 26, 124-129.

Ulrich, R.E., Stacknik, T.J. and Mabry, J.H. Control of Human Behavior, Glenview, Illinois: Scott, Foresman and Co., 1966.

Ulrich, R.E. and Surratt, P.R. Accelerated training program in under-privileged environments. Michigan Mental Health Research Bulletin, in press.

Ulrich, R.E. and Symmek, B. "Pain as a Stimulus for Aggression." In Biology of Aggressive Behavior. The Proceedings of the International Symposium on Aggressive Behavior, Milan, 1968. Amsterdam: Excerpta Medica Foundation, in press.

Ulrich, R.E. and Wolfe, M. The in-school treatment program. Michigan Mental Health Research Bulletin, in press.

Ulrich, R.E., Wolfe, M. and Bluhm, M. Operant conditioning in the public schools. Educational Technology Monographs, Kalamazoo Valley Intermediate School District, 1968, 1(1).

Ulrich, R.E., Wolff, P.C. and Azrin, N.H. Shock as an elicitor of intra- and inter-species fighting behaviour. Animal Behaviour, 1964, 12(1), 14-15.

Vernon, W. and Ulrich, R.E. Classical conditioning of pain-elicited aggression. Science, 1966, 152(3722), 668-669.

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